Maryland
Department of Agriculture

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Office of Plant Industries and Pest Management

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Anthony G. Brown, Lt. Governor
Earl F. Hance, Secretary
Mary Ellen Setting, Deputy Secretary

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PESTICIDE REGULATION SECTION
(410) 841-5710

May 3, 2012

Tawanda Maignan, Team Leader
Emergency Response Team (H7505C)
U.S. EPA / Office of Pesticide Programs
Document Processing Desk
Crystal Mall 2 - 2nd Floor
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Dear Ms. Maignan:

The Maryland Department of Agriculture, as state lead agency for pesticide regulation, hereby requests an Emergency Exemption from FIFRA under Section 18. This exemption, if approved, would allow the use of bifenthrin to control Brown marmorated stink bugs (*Halyomorpha halys*) on stone and pome fruit. This request is being submitted in cooperation with the states of Delaware, New Jersey, North Carolina, Pennsylvania, Virginia and West Virginia. Enclosed, is a complete application (3 copies) submitted by Bryan R. Butler, Sr., Senior Extension Agent, University of Maryland.

The Pesticide Regulation Section of the Maryland Department of Agriculture will ensure all provisions of this request are honored in the State of Maryland. If you require any further information, please do not hesitate to contact Mr. Dennis Howard at (410) 841-5710. Your assistance in this matter is appreciated.

Sincerely,

Mary Ellen Setting for

Earl F. Hance
Secretary

EFH: dh
cc:file
Section 18 file

Application for Section 18 Emergency Exemption

The following information is required for an emergency exemption request based on the revised United States Environmental Protection Agency (USEPA) Code of Federal Regulations, Title 40, Part 166 concerning Section 18 requests. Requests which are incomplete will be denied by the USEPA without review. In order to comply with these requirements, the information listed below must be provided. Use additional pages if necessary. Please note that the more complete the questionnaire, the better your chances are of obtaining the exemption.

Type of Exemption Being Requested
(Check One)

X **SPECIFIC**
□ **QUARANTINE**
□ **PUBLIC HEALTH**

Contact Person(s) and/or Qualified Expert(s)

CONTACT PERSON:
Name: Dennis W. Howard
Title: Chief, Pesticide Regulation Section
Organization: Maryland Department of Agriculutre
Address:
50 Harry S. Truman Parkway
Annapolis, Maryland 21401
Phone: 410-841-5710
FAX: 410-841-2765
Email: dennis.howard@maryland.gov

QUALIFIED EXPERT:
Name: Bryan R. Butler, Sr.
Title: Senior Extension Agent
Organization: University of Maryland Extension
Address: 700 Agriculture Center
Westminster, Maryland 21157
Phone: 410-386-2760
FAX: 410-876-0132
Email: bbutlers@umd.edu

Description of Pesticide Requested

Common Chemical Name
(Active Ingredient): bifenthrin (IRAC Group 3 Pyrethroids)

Brand/Trade Name(s): Brigade WSB, , Bifenture EC, and 10DF	**EPA Reg. Nos.:** 279-3108 , 70506-227 and 70506-57
Formulation: WSB , EC and 10DF, respectively	**% Active Ingredient:** 10%, 25.1% and 10%, respectively

Manufacturer(s): FMC Corporation Agricultural Products Group and United Phosphorus Inc.
Address:
1735 Market Street Philadelphia, Pa. 19103 USA,
630 Freedom Business Center, Suite 402 King of Prussia, Pa. 19406 USA

If the product is **currently** federally registered include: (A) A copy of the federal label of the specified product; or the formulation(s) requested if a specific product is not request; and (B) A copy of any proposed additional Section 18 labeling. For **any other products** submit a copy of the confidential statement of formula or reference to one already submitted to USEPA and a complete copy of the proposed Section 18 labeling.

Notification of Registrant	
Date Sent: February, 2011	**Response Received:** FMC 3/18/12, UPI 3/13/12 **Representative**: FMC (Brigade) Contact: Adam Prestegord: Phone – (215) 299-6250. UPI (Bifenture) Contact: Dave Olson: Phone – (610) 491-2814.
Include Letter from Registrant as Separate Attachment.	

Name of Pest

Scientific Name: *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae)
Common Name: brown marmorated stink bug (BMSB)
Overview of BMSB phenology in the Mid-Atlantic region. BMSB overwinters as an adult (Watanabe et al. 1994) in a state of facultative diapause. The influence of potential mortality factors on the survivorship of this generation of BMSB in the eastern US has not been investigated. Adults emerge from overwintering sites in April and May and begin mating approximately two weeks later (Hoebeke and Carter 2003). Although females commonly mate several times, a single mating can result in egg production over half of their lives (Kawada and Kitamura 1983). Females typically deposit eggs in clusters on the undersides of leaves (Takahashi 1930). Each egg mass contains ~28 eggs (Kawada and Kitamura 1983, Nielsen et al. 2008a) and the reports of the average total number of eggs deposited per female range from about 212 (Nielsen et al. 2008a) to about 486 (Kawada and Kitamura 1983). Unlike the native species of stink bugs, whose nymphs feed on broadleaf weeds and other hosts outside the orchard, BMSB females also deposit eggs on orchard trees and nymphs and feed and complete their development on pome and stone fruit. Nielsen et al. (2008a) determined that development from egg to adult, including five nymphal instars, required approximately 50 d.

Nielsen et al. (2008a) also reported that BMSB populations in central NJ and PA showed one generation per year, while Leskey et al. (unpubl. data) documented two generations in Kearneysville, WV (Fig. 1). Overlapping nymphal and adult populations from these two generations in parts of the Mid-Atlantic region create a scenario in which tree fruit crops may be at continuous risk of attack. Since Hoffmann (1931) reported up to six generations annually in the southern parts of its range in China, BMSB is expected to show multiple generations in southern regions of the USA.

BMSB has pronounced dispersal behaviors and movement patterns. In spring, populations move from overwintering sites in woodlots, rock outcrops, and buildings in search of host plants, including tree fruit crops. During the growing season, BMSB is thought to move back and forth between native hosts and crops and between different crops. Although the timing of this movement in relation to its phenology or that of its different hosts is poorly understood, the potential for ongoing immigration of BMSB into tree fruit orchards during the growing season is a major concern. In late September and October, the second generation of BMSB adults returns to overwintering sites, often as massive aggregations consisting of thousands or tens of thousands of individuals. Its invasion of buildings during that period has potentially serious economic consequences for commercial enterprises (e.g. the hospitality industry) and also represents a very significant nuisance issue for homeowners.

Description of Proposed Use

Sites to be treated (i.e. crops, structures, etc): Pome fruit (apple, pear) and stone fruit (peach, nectarine,) orchards in New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, Virginia and North Carolina

Statewide or County specific (list counties):
New Jersey: Hunterdon, Warren, Morris, Sussex, Burlington, Middlesex, Mercer, Monmouth, Atlantic, Camden, Cumberland, Gloucester, Salem, Bergen, Somerset and Ocean counties
Pennsylvania: Statewide
Delaware: New Castle, Kent and Sussex counties
Maryland: Statewide
West Virginia: Berkeley, Hampshire, Jefferson, Morgan and Monroe counties.
Virginia: Statewide
North Carolina: Henderson, Polk, Cleveland, Lincoln, Wilkes, Alexander, Moore, Montgomery and Anson counties.

Method of application: Foliar application by ground airblast equipment

Rate of application in terms of active ingredient (a.i.): Brigade and Bifenture 0.45 lb a.i. per acre maximum post bloom.

Frequency/Timing of Application: Not less than seven (30) day intervals

Maximum number of applications: Two (2) applications per crop per year

Total acreage (or other units) to be treated: USDA NASS data for 2010 indicate 63,550 acres of bearing tree fruit orchards among six of the seven participating states (DE statistics not provided). These data reflect apples and peaches in NJ, PA, MD, WV, VA and MD and pears in PA. a reasonable estimate of total bearing acreage that might be treated with bifenthrin is 63,550 acres.

Total maximum amount of pesticide to be used (in terms of a.i. and product): Based on the acreage estimated above and two applications per crop per season at the **highest rate** requested on each product label, the total amount of pesticide that would be used is as follows:

Brigade WSB: 28,597.5 lb a.i. or 285,375 lbs. of formulated product
OR
Bifenture10DF: 28,597.5 lb a.i. or 285,375 lbs. formulated product
Bifenture EC: 28,597.5 lb a.i. or 1,830.240 fl. Oz. formulated product
Use Season/Duration of use (period of time for which use of chemical is requested:

Date First Application Needed: First application on May 25
Date Last Application Needed: Last application on October 15, prior to harvest of the latest apple varieties.

Restricted Entry Interval (REI): Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

Preharvest Interval (PHI): 14 days

Earliest possible harvest dates: NC peaches in mid-July; NC apples in late July

Additional Restrictions, User Precautions & Requirements, Qualifications of Applicators, etc.:

All applicable restrictions and requirements concerning the proposed use and the qualifications of applicators of Bifenthrin (Brigade WSB, Bifenture 10DF, Bifenture EC) are as follows:

- The product, Bifenthrin (Brigade WSB, Bifenture 10DF), Bifenture 2EC), (EPA not registered for apples or peaches /nectarines) may be applied

- Bifenthrin (Brigade WSB, Bifenture 10DF, Bifenture 2EC) must be applied only by certified, licensed applicators or by persons under the direct supervision of a licensed applicator. The licensed applicator must be certified in the category applicable to the application of pesticides for insect control in pome and stone fruits.

- Applicators and other handlers must wear a long sleeved shirt and long pants, shoes plus socks, and chemical resistant gloves made of Barrier Laminate, Nitrile Rubber, Neoprene or Viton and protective eyewear.

- Do not apply within 14 days of harvest.

Alternative Methods of Control

Registered Alternative Pesticides:
Table 1. Insecticides registered for use in **one or more pome and/or stone fruit** that are labeled for use against stink bugs*

Class	Active ingredient	Trade name(s)
Organophosphate	azinphosmethyl	Guthion
	chlorpyrifos	Lorsban and generics
Carbamate	methomyl	Lannate
	formetanate hydrochloride	Carzol
Pyrethroids	beta-cyfluthrin	Baythroid XL and Leverage

	Bifenthrin	Bifenture
	Cyfluthrin	Tombstone
	esfenvalerate	Asana
	fenpropathrin	Danitol
	gamma-cyhalothrin	Declare, Proaxis
	lambda-cyhalothrin	Warrior and generics, Voliam Xpress
	zeta-cypermethrin	Mustang Max
Neonicotinoids	acetamiprid	Assail
	Dinotefuran	Venom and Scorpion
	clothianidin	Belay
Organochlorine	endosulfan	Thionex

* Only products considered Good or Excellent against **native stink bugs** are included, based on Virginia Cooperative Extension recommendations to commercial tree fruit growers. **These recommendations do not necessarily translate directly to BMSB.** Information on label restrictions for individual products that will preclude their utility for BMSB management or their effectiveness against BMSB in laboratory bioassays is not included here, but is provided in "Discussion of Events or Circumstances Which Brought About the Emergency Condition", subsection "Managing BMSB".

Table 2. Insecticides registered for use in **one or more pome and/or stone fruit** that are not currently labeled for use against stink bugs but that may have Good to Excellent activity against stink bugs when applied for control of other pests*

Class	**Active ingredient**	**Trade name(s)**
Pyrethroid	permethrin	Ambush, Perm-Up and others
Neonicotinoid	thiamethoxam	Actara
Combination products	thiamethoxam + chlorantraniliprole	Voliam Flexi

* **Virginia Cooperative Extension ratings are based on product efficacy against native stink bugs and do not necessarily translate directly to BMSB**. Information on label restrictions for individual products that will preclude their utility for BMSB management is not included here, but is provided in "Discussion of Events or Circumstances Which Brought About the Emergency Condition", subsection "Managing BMSB".

Most pome and stone fruit growers in eastern USA production regions have not yet implemented full-season programs targeting brown marmorated stink bug (BMSB), but many will need to do so following extensive crop injury in the worst affected regions in 2010 and similar but less reported damage in 2011. BMSB populations are rapidly spreading and increasing in size, and pose a significant threat throughout the fruiting period of pome and stone fruits. Known to be highly polyphagous and to utilize numerous cultivated and wild host plants, damaging BMSB populations are not restricted to a single crop or habitat, but occur on a landscape scale. The strong potential for ongoing re-invasion of orchards through harvest will necessitate aggressive intervention with a range of insecticides. Given that BMSB nymphs appear more susceptible to many insecticides than adults (Neilsen et al. 2008b), optimally effective, insecticide-based management of BMSB will require products that show evidence of rapid adult intoxication, from which bugs do not recover. Furthermore, these products should show evidence of strong residual activity and that adult BMSB will succumb to contact with or ingestion of dried residues.

Bioassay data suggest that individual, labeled products within chemical classes vary substantially in their relative effectiveness against BMSB (Appendix 1). Although as yet untested against BMSB under field conditions, the products that may prove to be most effective are relatively few in number and their utility within seasonal programs will be affected by label restrictions (e.g. seasonal maximum, preharvest interval) and the inherent qualities of some active ingredients (e.g. short residual activity) (see Discussion of Events or Circumstances which Brought About the Emergency Condition: Managing BMSB). Furthermore, many of the products showing the strongest potential against BMSB are known to be highly disruptive to biological control agents and Integrated Pest Management programs when used in the post-bloom period. Management of BMSB will require the use of the strongest products available. Bifenthrin has shown excellent activity against other stink bug species in US crops, is a key product used for BMSB management in Asian tree fruit production and has shown the strongest activity among the pyrethroids evaluated in laboratory bioassays with BMSB.

Brief justification:

Eastern tree fruit growers face an unprecedented threat from BMSB and a relatively limited set of effective, labeled insecticide options for its management. Providing access to additional products with known efficacy against BMSB is expected to improve the probability of successfully controlling BMSB. Bifenthrin has been used against BMSB in Asian tree fruit orchards and has shown excellent activity against the pest in recent laboratory bioassays. This product would provide an excellent option for growers during periods of increased vulnerability such as the initial migrations into the orchard and when populations have begun to build in the orchard. Bifenthrin will also fill the mid-season gap that will be created as Endosufan is removed from use. Approval of a Section 18 petition for bifenthrin (Brigade WSB, Bifenture 10DF and Bifenture EC) will also enable more effective resistance management through rotation of efficacious products from different IRAC resistance groups. A bifenthrin section 18 will also compliment the dinotefuran section 18 as it is significantly less expensive per application and would not be used close to harvest as the dinotefuran with its short phi.

Alternative Control Practices: There are no non-insecticidal, alternative control practices for BMSB.

Efficacy of Use Proposed Under Section 18

(Efficacy data should include statistical data on comparative Virginia registered products (or federally registered products that could be registered in Virginia for such use). This data should also compare the currently registered products to the proposed product. Effects on crop yield and quality should also be documented.)

There are no field data on the efficacy of bifenthrin against BMSB in apple and peach orchards in the United States. Published reports on the effectiveness of bifenthrin against BMSB in Asian orchards have not been translated or are not yet published, although it is understood that products containing bifenthrin are standard components of BMSB management programs there.

Laboratory bioassays examining the response of adult BMSB after 4.5 hours of exposure to dried insecticide residues on glass surfaces (Leskey et al, unpubl. data) showed that bifenthrin ranked 3rd in efficacy against adult BMSB amongst all products tested. 2). BMSB adults succumbed to exposure to dried bifenthrin residue with no bugs recovered from exposure over 7-days, and mortality after 7 days was highest (Fig. 2)

Kuhar (unpubl. data) used a dipped green bean bioassay to evaluate the toxicity of a range of products to both adult and nymphal BMSB. (Appendix 2) shows data from adult BMSB assays, which involved continuous exposure to residues and enabled feeding on bean with 100% mortality.

In general, the results from these two studies, which differed substantially in method and duration of exposure, were quite similar.

(Efficacy data and/or other references included as separate attachment(s))

Expected Residue Levels in Food

The USDA's Pesticide Data Program is initiating a monitoring program for bifenthrin residues on apples, peaches and pears through their work with EPA's Health Effects Division to help provide data to support a Section 18 tolerance for bifenthrin on apples, peaches, and pears to combat the brown marmorated stink bug.

(Residue data included as separate attachment)

Discussion of Risk Information

(Potential risks to human health, endangered or threatened species, beneficial organisms, and the environment)

Description of application sites, including proximity to residential areas, aquatic systems, endangered or threatened species habitats, soil types, etc.:

Application sites will be restricted to commercial apple peach/nectarine orchards in NJ, PA, DE, MD, WV, VA and NC. Proximity of these sites to residential areas, aquatic systems or endangered or threatened species habitats, soil types, etc. will vary by site and by state.

Possible risks posed by the user:

The following is copied directly from specimen labels (attached) for (Brigade WSB, Bifenture 10DF and Bifenture EC) Insecticides. Also please refer to attached MSDS for Brigade WSB, Bifenture 10DF and Bifenture EC .

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not apply when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment wash waters.

This product is toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not allow it drift to blooming crops or weeds while bees are actively visiting the treated area. The use of bifenthrin is prohibited in areas that may result in exposure of endangered species to bifenthrin. Prior to use in a particular county contact the local extension service for procedures and precautions to use to protect endangered species.

Proposals to mitigate risks: Reference specimen labels (attached)

Coordination with Other Affected Federal State, and Local Agencies

Under the Maryland Pesticide Applicators Law the Maryland Department of Agriculture (MDA) is the state lead agency for pesticide regulation. MDA has consulted with the Maryland Department of Natural Resources, Wildlife Heritage Program regarding this application.

Enforcement Program

(Explanation of legal authority and program resources for enforcement)

Include Description of the Enforcement Program, and Procedures for assuring Compliance:

The Maryland Department of Agriculture is the state lead agency charged with the responsibility of enforcing FIFRA as amended within the State of Maryland. This designation is the result of a continuing enforcement grant between the Department and MDA. As the State Lead Agency the Maryland Department of Agriculture will take appropriate steps to ensure that the conditions of this exemption are met.

Specific exemptions may be granted by the Environmental Protection Agency pursuant to FIFRA Section 18 and 40 CFR Part 166. The Department has the authority and responsibility to enforce any special requirements that EPA might see fit to impose on an approved Section

18 label. The proposed use of dinotefuran under this Emergency exemption request will be monitored by Maryland Department of Agriculture.

Education is a critical component of any enforcement program. The Department relies strongly on the educational outreach provided by the University of Maryland's Cooperative Extension Service. The Extension Service will inform Extension Agents of the Emergency exemption program requirements and the guidelines which growers and applicators must follow when using dinotefuran insecticide. Extension personnel will be available to answer questions which might arise regarding procedures of application.

Repeat Uses

If use being requested is a repeat use, and the final report has not been filed, include the interim report as a separate attachment

Progress Toward Registration

Information from the registrant concerning current status)
(Not Required for Request for a Quarantine Exemption)

[X] NO APPLICATION FOR REGISTRATION OF THE USE IS UNDER REVIEW BY USEPA.

[ ] USEPA IS REVIEWING AN APPLICATION FOR REGISTRATION OF THIS USE (TYPE OF REGISTRATION ________________________).

[X] AN IR-4 PETITION FOR TOLERANCE IS BEING DEVELOPED OR IS UNDER REVIEW BY USEPA.
PETITION # IR-4 PR No. 09548

[ ] A PETITION FOR TOLERANCE HAS BEEN SUBMITTED TO USEPA BY THE MANUFACTURER.
PETITION # ________________________

[ ] A PETITION FOR TOLERANCE OR AN APPLICATION FOR REGISTRATION HAS BEEN DENIED (INDICATE THE CIRCUMSTANCES ____).

IF THIS USE PATTERN WILL BE NEEDED FOR MORE THAN ONE SEASON, A PERMANENT TOLERANCE SHOULD BE PURSUED IMMEDIATELY. CONTACT THE MANUFACTURER OR IR-4 TO INITIATE THE ESTABLISHMENT OF A PERMANENT TOLERANCE.

SPECIFIC EXEMPTION BASIS:
Significant Economic Loss

Discussion of Events or Circumstances Which Brought About the Emergency Condition

If this use is for a crop, include a detailed description on such things as the crop biology, crop threshold level to the pest, etc. Also, indicate origin of pest, means of its introduction, and spread into the area (if known):

If this use is for a crop, include a detailed description on such things as the crop biology, crop threshold level to the pest, etc. Also, indicate origin of pest, means of its introduction, and spread into the area (if known):

Invasion and spread of BMSB in the US. BMSB is an invasive stink bug that is native to Japan, Korea, Taiwan, and China and that was officially identified in the USA in 2001 from specimens collected in Allentown, PA in the late 1990's (Hoebeke and Carter 2003). Large and damaging populations are now established in parts of PA, NJ, DE, MD, WV, VA and NC. Letters in support of this petition from participating state Departments of Agriculture (see attached) reflect the severity of the problem and the significant levels of concern being expressed by members of the tree fruit and other agricultural industries in each state. Established BMSB populations have recently been detected in CA, CT, IN, KY, NH, NY, OH, OR, RI, and TN, though crop losses have been minimal at this early stage of infestation. Additional states in which BMSB has been detected include AL, AZ, FL, GA, IA, IL, KS , ME, MI, MN, MS, NE, NM, RI, SC, TX, VT, WA, and WI, and further detections and range expansion of BMSB are anticipated in 2012 and beyond.

It appears that BMSB populations in the Mid-Atlantic region have increased in size and distribution in the absence of any natural factors that might otherwise have suppressed their growth and spread. Limited surveys of native natural enemies of BMSB over the last six years have revealed levels of egg and adult parasitism that are typically less than 5% (K. Hoelmer, unpubl. data). Native natural enemies recorded to date include specialist Pentatomid parasitoids in the orders Hymenoptera (*Trissolcus* spp.; egg parasitoid), and Diptera (*Trichopoda* spp.; lays eggs on adults, although none have developed on BMSB) (K. Hoelmer, unpubl. data). Foreign exploration has identified several species of *Trissolcus* egg parasitoids that appear to be promising biological control agents, typically causing 50-80% parasitism of BMSB in Asia. At least four of those species are in culture at the USDA-ARS quarantine facility in Newark, DE, and while classical biological control may eventually provide a promising long-term solution, possible implementation of this approach will require at least several more years of host range testing and other evaluations.

Host range. Another factor likely associated with the recent spread and growth of BMSB populations in the Mid-Atlantic region is its highly polyphagous habit; over 300 host plants have been noted in Asia. Crops mentioned in the Asian literature as being susceptible to attack broadly include tree fruits, vegetables, shade trees, and leguminous crops, with specific mention of apple, cherry, peach, pear, citrus, lima beans, and fig (Panizzi et al. 2000, Hoebeke and Carter 2003). Surveys conducted in the United States identified a number of tree fruit crops that serve as hosts for BMSB, including apple, plum, peach, pear and cherry (Bernon 2004, Nielsen and Hamilton 2009a, b).

Impact of BMSB on orchard crops in 2010. In 2010, BMSB emerged suddenly as a pest of unprecedented importance in tree fruit and other crops in the Mid-Atlantic region. USDA NASS (2011) statistics for 2010 show 63,550 acres of bearing pome (apple, pear) and stone (peach) fruit among the states participating in this petition. Statistics for Delaware and for other stone fruit crops were not provided. Statistics for pear were provided only for Pennsylvania. The estimated value of utilized production of apples, pears and peaches in 2010 was $242,311,000. Anecdotally, relative levels of injury to Mid-Atlantic tree fruit crops in 2010 varied among regions, among orchards within a region, and among individual blocks within farms. The factors underlying this variation are as yet unknown, but may be due to one or more of the following, 1) differences in pest pressure, 2) differences in susceptibility among varieties, 3) differences in the specific location of individual blocks (e.g. relative to external sources of BMSB), and 4) differences in management programs. Although BMSB populations are currently considered to be highest in parts of WV, MD, northern VA and some counties in central VA, damaging populations were observed in parts of PA, NJ, southwest VA and NC in 2010. In the worst affected areas, some peach orchards experienced 100% fruit loss and apples in some orchards showed >50% injury. Counties in northern VA are considered to be at the leading edge of the heaviest BMSB pressure, although established populations in other states in the region will likely increase in size and expand their geographic range on an ongoing basis.

BMSB feeding injury. BMSB has piercing-sucking mouthparts that are inserted through the fruit skin into the flesh to extract fluids. Feeding on peach fruit results in gummosis (i.e. extrusion of a thick, translucent gel at injury sites on the surface) and sunken, misshapen areas on the fruit surface known as "catfacing". Internally, BMSB causes discrete discolored, corky and/or hollow areas in peaches that may or may not correspond with surface injury and that may extend to the pit. When not associated with visible external injury, this internal damage is especially problematic in that apparently uninjured fruit at harvest are found to be unmarketable only after cutting or biting into them. In apples, BMSB feeding causes a range of surface injuries that may be associated with the time at which feeding occurs and/or the variety and that may progress as fruit mature (Leskey et al. 2009). The most apparent external injury is manifest as shallow depressions with or without discoloration. Internally, apples show discrete areas of brown, corky flesh that may extend to the core. This injury is similar to that induced by feeding of the native stink bug species and that, in the past, has likely been misdiagnosed as a physiological disorder associated with calcium deficiency, known as cork-spot (Brown 2003). Another major effect of BMSB feeding that emerged in 2010 was the expression of post-harvest injury by apples. Fruit that had been deemed damage-free and graded at packinghouses subsequently showed areas of brown discoloration on the fruit surface after a period in cold-storage, adding unexpected and significant economic loss. Although not yet systematically evaluated, this injury may have been due to feeding late in the season, during the final weeks before harvest. Injury expression in pears is similar to that in apples. Among the stone fruit, injury in apricots and nectarines is likely to be similar to that in peaches, although the manifestation of injury by plums and cherries has not yet been well described.

Monitoring BMSB. Monitoring tools are typically used by growers to assess the presence, abundance, and seasonal activity of a pest to determine the need for and timing of insecticide applications. Aldrich et al. (2007) and Khrimian et al. (2008) confirmed that the aggregation pheromone of the Asian brown-winged green bug, *Plautia stali* Scott, methyl (2*E*,4*E*,6*Z*)-decatrienoate (Sugie et al. 1996), is cross-attractive to BMSB, as was previously reported in Asia (Tada et al. 2001 a, b, Lee et al. 2002). Although this compound reliably attracted BMSB nymphs to ground-deployed pyramid traps in the Mid-Atlantic in 2010 (Leskey et al., 2012), adults are attracted to it only very early (Tada et al. 2001a) and late in the season (Leskey et al., 2012, Tada et al. 2001a, Khrimian et al. 2008). Thus, identification of the specific BMSB aggregation pheromone season is crucial and the subject of on-going research at USDA ARS, Beltsville, MD. Native stink bug species have been monitored effectively in tree fruits using yellow ground- and tree-deployed pyramid traps baited with methyl (2*E*,4*Z*)-decadienoate (Leskey and Hogmire 2005, Hogmire and Leskey 2006) and in vegetable and row crops using black light traps (Kamminga et al. 2009). Although black light traps have been evaluated for BMSB monitoring in Japan (Moriya et al. 1987) and New Jersey (Nielsen and Hamilton 2009a) and ground-deployed black pyramid traps baited with methyl (2*E*,4*E*,6*Z*)-decatrienoate were tested in commercial orchards in WV, MD, VA, NJ, and PA in 2010 (Leskey et al., 2012), these preliminary studies did not attempt to relate captures to crop injury and there is currently no system to effectively and reliably monitor BMSB in any cropping system.

Managing apple and peach pests. Given that peaches and apples represent the vast majority of tree fruit acreage in production in the seven states participating in this petition, a discussion of pest management practices will be confined to those crops. Prior to the invasion of BMSB, apple and peach growers devised seasonal programs in response to several direct pests (i.e. those that lay eggs and/or feed on fruit) and a number of secondary pests (i.e. those that do not feed on fruit). While the pest complex and relative importance of individual direct and secondary pests varies among states and regions, some generalities can be made. The most damaging direct pests that overlap both crops include oriental fruit moth, plum curculio, tarnished plant bug, several species of leafroller and San Jose scale. In peaches, native stink bugs species are typically more problematic than in apples. Additional direct pests of apples that usually require annual intervention include codling moth, rosy apple aphid and apple maggot. Mites (i.e. European red mite and two-spotted spider mite) are potentially serious secondary pests of apple but are typically not as problematic in peaches. A number of other secondary pests can impact apple and peach production, but are generally managed well by the insecticides used to target the direct pests. In general, 7-8 pesticide applications per year are required to manage insect and mite pests in peaches, while 8-11 applications per year are used in apples, depending on pest pressure, variety (i.e. harvest date) and use of other tactics (e.g. mating disruption). Growers typically rotate their annual insecticide applications among several chemical classes, according to the pest(s) targeted at various points in the season. Cooperative Extension Service personnel have long recommended the avoidance of certain products or classes (e.g. pyrethroids) after a certain point in the season, due their known disruptive effects on beneficial arthropods and the potential to incite secondary pest outbreaks. For this reason adding bifentrin, which is significantly more effective on BMSB than most other pyrethroids, to the growers toolbox could limit the applications of the less effective pyrethroids with bifentrin being used strategically at specific times in the season when BMSB pressure is greatest.

The Food Quality Protection Act (FQPA) of 1996 provided the impetus for eastern tree fruit growers to begin the transition away from conventional insecticides and pest management programs and the adoption of new tactics and strategies. In concert, the availability of new, highly efficacious "reduced risk" and "organophosphate replacement" insecticides and the increasing use of non-insecticidal options (e.g. mating disruption) and decision tools (e.g. pheromone based monitoring, degree-day phenology models) for managing orchard pests has advanced the actual practice and practically of Integrated Pest Management (IPM) tremendously in the last decade.

Managing BMSB. Unfortunately, many of the newer insecticides are not effective against stink bugs in general and management of BMSB is likely to be further complicated by the tremendous season-long pressure that high populations can exert. Since BMSB is a newly established pest, there is a profound lack of background data from field studies with which to devise sustainable management programs that will target it and the other key pests needing intervention. Although mating disruption for oriental fruit moth and/or codling moth remains an option, insecticides will be essential to BMSB management in tree fruit orchards unless and until alternative strategies and tactic are developed.

Some growers who experienced early problems with BMSB in 2009 initiated targeted programs against it early in the 2010 season, while many others began to respond to BMSB somewhat later in 2010, upon realizing the magnitude of the pest pressure. In both scenarios, growers used their experience, Cooperative Extension recommendations for native stink bugs, and business acumen to select products that they felt would provide effective and affordable fruit protection. Still, many of them suffered major injury and economic loss at harvest. This was likely due at least in part to their product selections, which occurred in the absence of sufficient field or laboratory data on how individual products might perform relative to others at the application rates and timings used. In retrospect, based on the results of laboratory assays (see below), many of the products used in 2010 would not have been expected to be the strongest options for BMSB. Furthermore, growers who began responding later in the season may have incurred prior injury that exacerbated their losses at harvest.

Many registered compounds that are or are not labeled for use in one or more tree fruit crops have now been evaluated against BMSB in laboratory assays. Nielsen et al. (2008b) developed LC_{50} values for adults and nymphs, while Leskey et al. (submitted) and Kuhar (unpubl. data) screened a wider range of products presented to adult BMSB, respectively, as dry residue on glass surfaces (4-hour exposure) and dry residue on green beans (continuous exposure over several days). Trials at the USDA ARS (Leskey et al. submitted) have provided the most comprehensive evaluation of products to date (Appendix 1), and results from those assays are those discussed in most detail, below.

Although their relative performance against BMSB under field conditions is still being established, a number of products from different chemical classes showed good to excellent activity. The ten most effective compounds were, in descending order; dimethoate, malathion, bifenthrin, methidathion, endosulfan, methomyl, chlorpyrifos, acephate, fenpropathrin and permethrin
(Appendix 1). However, product registrations and legal restrictions preclude or significantly diminish the utility of nine of these products against BMSB in apples and/or peaches, especially given that BMSB management will need to occur in the post-bloom period. These restrictive factors are as follows:

Product labels

- Dimethoate and acephate are not labeled for use in either crop.
- Malathion is labeled only for peaches
- Methidathion is labeled only for apples.
- Endosulfan will be phased out in peaches on July 31, 2012 and in apples on July 31, 2015

Label restrictions (application timing)

- Chlorpyrifos and methidathion cannot be applied as a foliar spray after bloom
- Permethrin cannot be applied in apples after petal-fall

Inherent characteristics of individual insecticides or insecticide classes will further influence the performance, utility or overall impacts of some, as follows:

- Malathion and methomyl are known to have very short residual activity in the field.
- Pyrethroids and methomyl are highly toxic to the arthropod natural enemies of insect and mite pests of orchards.

Thus, among the USDA ARS bioassays bifenthrin ranked 3rd in efficacy against adult BMSB. Among these top ten materials, only fenpropathtrin can be used on apples and peaches (Appendix 1). Thus, growers are highly restricted in terms of material selections against BMSB. Other insecticides that apple and/or peach growers have relied on for relatively broad spectrum control of orchard pests (e.g. phosmet, acetamiprid, thiacloprid) showed poor activity against BMSB adults in USDA ARS laboratory bioassays.

The USDA ARS data have provided strong indications that individual active ingredients within a chemical class vary substantially in their effectiveness against BMSB and that product selection will need to be based heavily on active ingredient. In laboratory trials (Nielsen et al. 2008b, Leskey et al., unpubl. data) and from preliminary field studies (Leskey 2011), BMSB adults have been observed to show quick initial "knock-down" following exposure to some pyrethroids and then to recover after a period of intoxication. In the field, >33% of moribund adult BMSB recovered after direct exposure to cyfluthrin, and in commercial orchards BMSB recovery rates of up to 80% following insecticide exposure were reported.

The narrow range of efficacious insecticides for managing BMSB in apple and peach orchards is an extremely serious issue for growers and their advisors, especially given the need to simultaneously control the other direct and indirect pests. It appears inevitable that products known to be disruptive to IPM and biocontrol (e.g. methomyl, pyrethroids) will factor heavily in seasonal programs for BMSB. Use of these products at the rates, timing and frequency needed to control BMSB will undoubtedly cause outbreaks of one or more secondary pests in many orchards, leading to additional insecticide and miticide applications. Having bifenthrin which is significantly more effective than the other pyrethrioids in the growers' toolbox could reduce the number of less effective pyrethroid applications. Approval of a Section 18 petition for bifenthrin (Brigade 2EC, Bifenture 10DF) could reduce the chance of these outbreaks and may enable more effective resistance management through rotation of efficacious products from different IRAC resistance groups by better targeting BMSB. Providing access to this product with known excellent efficacy against BMSB is expected to improve the probability of successfully controlling BMSB while reducing the potential impact on beneficial insects and overall IPM programs.

Bifenthrin has been used against BMSB in Asian tree fruit orchards and has shown excellent activity against the BMSB in recent laboratory bioassays. Cooperative Extension Service personnel have long recommended the avoidance of certain products or classes (e.g. pyrethroids) after a certain point in the season, due to their known disruptive effects on beneficial arthropods and the potential to incite secondary pest outbreaks. The secondary pests of greatest concern include San Jose scale and mites in apples and peaches, and woolly apple aphid in apples, although major disruption of biocontrol agents could cause unexpected additional secondary pest outbreaks. To avoid this situation the section 18 for dinotefuran (neonicotinoid) which can be used in the later season greatly compliments the mid-season use of bifenthrin.

Bifenthrin will provide an excellent option for growers as an early to midseason product due to the lack of products that are as effective chemical options for BMSB control. This is a period when BMSB pressure is increasingly imposing. Fruit becomes increasingly vulnerability as the initial migrations of BMSB move into the orchard from overwintering sites and again when

producers face the potentially relentless pressure mid-season when nymphal populations have the potential to build in orchards while at the same time migrating first generation adults have begun to move into the orchard from the unmanaged areas which can continue to harvest. Later season control options will certainly be enhanced as the section 18 for dinotefuran (neonicotinoid) comes into play. BMSB control will doubtlessly be enhanced as bifenthrin complements the dinotefuran section 18 which would be a product primarily used in the late season due to its short phi.
The need for bifenthrin will be accentuated as endosulfan is removed from the market. Bifenthrin availability in mid-Atlantic orchards will be critical to fill the mid-season gap that will be created as Endosulfan is removed from use. Another potential compliment between these section 18's is the relatively low cost of bifenthrin. Use of bifenthrin earlier in the season may help to offset the extremely high cost of applying dinotefuran at the end of the season. Clearly, tree fruit growers in regions affected by BMSB need all possible management options and tools if they are to remain productive and viable in the long term. Access to bifenthrin would be an important step in meeting that urgent and immediate need. Furthermore, given the emerging national issue with BMSB, experience with seasonal programs including bifenthrin in eastern tree fruits could translate directly to its management in the same and other crop systems that may be risk elsewhere in the USA.

Discussion of Economic Loss

The extent of BMSB injury to Mid-Atlantic tree fruit crops in 2010 was not fully understood until well after fruit had been harvested, due to a number of factors. Some growers who experienced injury did not recognize it as being associated with BMSB until after harvest. Since mature peaches can express internal injury that is not necessarily manifest externally, some peach producers learned of poor internal fruit quality only after having sold fruit to distributors or processors. An especially significant factor in apples was the expression of injury only after a period in cold storage. Consequently, in combination, these factors preclude the ability to accurately quantify injury and direct economic losses for the 2010 season. However, Mr. Mark Seetin, Director of Regulatory and Industry Affairs, US Apple has provided a *post hoc* assessment of 2010 crop losses for Mid-Atlantic apples (Appendix 4). This assessment suggested an 18% loss from BMSB, valued at $37,000,000.

Figures 3A and B show fruit injury data from six West Virginia and Maryland peach and apple orchards, respectively, from which 100 fruit were destructively sampled from border and interior rows at weekly intervals from July 23 – October 6 (apples) and July 23 – August 20 (peaches) (Leskey et al., unpubl. data). All fruit were evaluated for the presence and severity of internal injury from BMSB by thin-sectioning them to the core or pit. Injury severity values represent the number of discrete areas of internal injury recorded. Qualitative indications of pest pressure from BMSB in each orchard were based on individual grower perceptions of the size of overwintering populations in fall 2009. The relative "aggressiveness" of the insecticide programs used in each orchard was based on spray records and on whether individual growers specifically targeted BMSB through much of the 2010 growing season. Injury to both apple and peach fruit was excessive in all blocks, regardless of the perceived size of the overwintering population or the extent to which each grower specifically targeted BMSB in 2010.

Ms. Kay Rentzel, Managing Director, National Peach Council, submitted the following statement regarding the estimated economic loss to the Mid-Atlantic peach crop in 2010:

April 15, 2011

Chris,

At this time, I've had to really just estimate the figures based on some grower in put, as I found that RMA (USDA Risk Management Agency) does not track loss due to specific injury or condition (i.e. weather, pest, etc.)

We have estimated the loss in the mid-Atlantic states of Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia and West Virginia to be approximately $16 million dollars to the producer.

Thanks for your patience.

Kay

Figures 3A and B show fruit injury data from six West Virginia and Maryland peach and apple orchards, respectively, from which 100 fruit were destructively sampled from border and interior rows at weekly intervals from July 23 – October 6 (apples) and July 23 – August 20 (peaches) (Leskey et al., unpubl. data). All fruit were evaluated for the presence and severity of internal injury from BMSB by thin-sectioning them to the core or pit. Injury severity values represent the number of discrete areas of internal injury recorded. Qualitative indications of pest pressure from BMSB in each orchard were based on individual grower perceptions of the size of overwintering populations in fall 2009. The relative "aggressiveness" of the insecticide programs used in each orchard was based on spray records and on whether individual growers specifically targeted BMSB through much of the 2010 growing season. Injury to both apple and peach fruit was excessive in all blocks, regardless of the perceived size of the overwintering population or the extent to which each grower specifically targeted BMSB in 2010.

Use of three-tier approach to determine if SEL has occurred or will occur. An SEL can be justified if:

A. Tier 1-Yield Loss of at least 20%:

- Compare expected yield under pest emergency with non-emergency three-year average yield.
- Yield under pest emergency estimated using the most effective available alternative control (chemical or non-chemical).

- Average yield loss per acre for crop, not worse case scenario. Data from economic injury studies or comparative efficacy studies taken on yield. Industry field trials can be used.
- Efficacy data to support expected yield loss using available pest control alternatives.

Example Table for Documenting Tier 1 Yield Loss

Tier 1-Yield Loss				
Treatment	**Percent Control of Pest (efficacy)**	**Percent Crop Injury**	**Yield per Acre**	**Percent Change Compared to Three-year Average Yield**
Requested Chemical				
Registered Alternative				
Registered Alternative				
Registered Alternative				
Untreated				

If Tier 1 criteria is not met, then Tier 2 criteria can be considered:

B. Tier 2-Loss of at least 20% of gross revenue:

- Compare gross revenue from crop grown under normal conditions versus gross revenue under emergency conditions when the best alternative chemical is used to control the pest.
- Pest emergency crop revenue determined as crop average revenue, not the worst case scenario.
- Supporting information-Yield loss from Tier 1 evaluation and
- Baseline yield, Price (by end market), and losses to gross revenue due to quality (shift in grade or price reduction) and/or added production costs (e.g., sorting or repacking costs, additional pest control costs).
- Information from national or state Agricultural Statistics Services (NASS or SASS) reports, crop reports, market surveys, futures market, university crop production costs analysis, can be used.

Example Table for Documenting Tier 2 Gross Revenue Loss

Tier 2-Gross Revenue Loss				
Crop	**Baseline-average yield without pest emergency**	**Pest Emergency-average yield with best alternative control measure**	**Difference Between Baseline & Emergency**	**Percent Change**
Yield/acre				
Price per unit				
Gross revenue				

If Tier 1 and Tier 2 criteria cannot be met, then Tier 3 criteria can be considered:

C. Tier 3-Loss of at least 50% of Net Operating Revenue:

- Compare the Net Operating Revenue expected with the pest emergency using the best control alternative and average loss for the crop to the non-emergency Net Operating Revenue.
- Net Operating Revenue = Gross Revenue – Variable Operating Costs.
- Variable Operating Costs – Includes annual purchased inputs: hired labor, fertilizer, fuel, pesticides, seed, other materials, etc. It does not include the cost of or depreciation of machinery, land costs, taxes other overhead.
- Information from grower surveys, university crop production costs analysis, etc. can be used.

Example Table for Documenting Tier 3 Percent Loss of Net Operating Revenue

Tier 3-Percent Loss of Net Operating Revenue				
Crop	**Baseline-average yield without pest emergency**	**Pest Emergency-average yield with best control alternative**	**Difference Between Baseline & Emergency**	**Percent Change**
Yield/Acre				
Price per unit				
Gross Revenue				
Cost ($/acre)				
Seed, fertilizer				
Other inputs				
Harvest costs				
Total Operating Costs ($/acre)				
Net Operating Revenue ($/acre)				

Food Quality Protection Act of 1996

To avoid unnecessary delays in processing the Section 18 request, the U.S. EPA recommends that you fully address the following questions:

1. Is there a possibility that the chemical may transfer to or be found in drinking water? Based on available information, the discussion should include, but not be limited to, information indicating if the pesticides is persistent and/or mobile, relevant product chemistry, and available modeling. Further, information concerning State drinking water monitoring programs should be provided (i.e. Does the State routinely monitor for the pesticide? Has it been detected? What are the detection limits? Etc.).

2. Are there any residential uses of the chemical? If so, please provide information on these uses, including, but not limited to application sites, rates, and formulations used.

3. Is there any information for this pesticide regarding a common mode of action with other pesticides?

4. When will the crop be harvested?

If any of the aforementioned information is not readily available, you should contact the manufacturer of the chemical. In most cases, the information is available and can be accessed by the company and submitted to the State.

Requests for Section 18s undergo review by an *ad hoc Review Committee*. Reviewers are typically allowed 30 days to review submissions unless the situation warrants an expedited review as determined by agency staff. Be sure to plan adequate time when submitting requests for Emergency Exemptions to allow for processing and review of the submission.

If you have any questions regarding this form, contact Micah Raub by phone at (804) 786-4845 or by e-mail at howarddw@mda.state.md.us If you wish to submit documents electronically, contact Mr. Raub in advance.

Please return this completed form to: **Dennis W. Howard, Chief**

Maryland Department of Agriculture
Pesticide Regulation Section
50 Harry S. Truman Parkway
Annapolis, MD 21401-7080

If you plan to use a courier other than the U.S. Postal Service you will need to send the form to:

Dennis W. Howard, Chief
Maryland Department of Agriculture
Pesticide Regulation Section
50 Harry S. Truman Parkway
Annapolis, MD 21401-7080

Threatened and Endangered Species in Maryland

The list of Federal and State threatened and endangered species for Maryland can be found at the following websites:
http://ecos.fws.gov/tess_public/TESSWebpageUsaLists?state=md and
http://www.dnr.state.md.us/wildlife/espaa.html

Maryland has 26 listings of threatened and endangered species: nineteen animals and 7 plants.

1. Plants - Canby's dropwort, the Swamp Pink, the Sandplain gerardia, the Seabeach amaranth, the Sensitive joint-vetch, the Harperella, and the Northern Bulrush. The small Maryland population of Canby's dropwort occurs on a protected site in Queen Anne's County, which is not a primary production area for pome and stone fruits. The populations of Swamp Pink occur in the Coastal Plain and are located on privately owned land in Anne Arundel, Cecil, and Dorchester Counties. The Swamp Pink occurs in a variety of wetland habitat and requires habitat which is saturated, but not flooded with water. These areas are not located in pome and stone fruit production areas. The Sandplain gerardia grows in a rare prairie-like habitat called a serpentine barren where most vegetation is sparse and pome and stone fruit are not grown in these areas. The Harperella is found in the Sideling Hill Creek and Fifteen Mile Creek areas in Western Maryland where pome and stone fruit are not grown. Northern Bulrush is restricted to wetland habitats while Seabeach amaranth is found on sandy beaches. Sensitive joint-vetch is native in freshwater to slightly brackish tidal marshes in Somerset and Wicomico Counties and prefers the lower edge of the inter-tidal marsh zone, where pome and stone fruits are not produced. .

2. Animals - Maryland Darter, Sea Turtles (Hawksbill, Green, Leatherback, Loggerhead, and Kemp's ridley), Northeastern Tiger Beetle, Puritan Tiger Beetle, Bog Turtle. Dwarf Wedge mussel, Whales (Finback, Humpback, and Right), Delmarva Fox Squirrel, and the Piping Plover. The habitat of the Whales, Sea Turtles, Piping Plover, Tiger Beetles, and Dwarf Wedge mussel are not in areas where pome and stone fruit are grown. The Agency issued Interim Measures (County Bulletin copy attached) to protect the Maryland Darter in September 1991. These measure included application limitations, in Harford County Maryland, on land along the Buck Branch (entire length), Deer Creek (from U.S. Highway 1 downstream to the Susquehanna River), Elbow Branch (the entire length), and Gashey's Creek (the entire length). Depending on the pesticide product applied the limitations ranged from (1). Do not apply directly to water within the shaded area; (2). Do not use within 20 yards of the water's edge for ground applications, nor within 100 yards for aerial application; and (3). Do not use within 100 yards of the water's edge for ground application, nor within ¼ mile for aerial applications. MDA has continued to make copies of the Agency's County Bulletin to County Extension Agents and growers.

Appendix 1.

Table 2. Lethality index of Top 10 candidate insecticides as well as the initial efficacy rating and the change in efficacy over the 7-d trial (laboratory data). Leskey et al. In press.

Rank	Insecticide	Class[a]	Lethality Index	Initial Efficacy[b] (E_0)	Efficacy Change[c] ($E_7 - E_0$)
1	Dimethoate	O	93.3	High	Stable
2	Malathion	O	92.5	High	Stable
3	Bifenthrin	P	91.5	High	Stable
4	Methidathion	O	90.4	High	Stable
5	Endosulfan	-	90.4	Moderate	Increasing
6	Methomyl	C	90.1	High	Stable
7	Chlorpyrifos	O	89.0	Moderate	Increasing
8	Acephate	O	87.5	Moderate	Increasing
9	Fenpropathrin	P	78.3	High	Stable
10	Permethrin	P	77.1	High	Stable

Appendix 2.
2011 Reported Damage Data for the States

Delaware fruit growers indicated that BMSB resulted in 30-40% damage on apples and 20% on peaches.

West Virginia orchards reported damage at harvest ranging from 7.5-19.0% in peaches (regional average = 13.5%), in spite of increasingly aggressive tactics. In apples, the range was from 13.5%-46.0% (regional average = 26.2%). .

Maryland orchards percent total crop damage of Apples due to BMSB damage in 2011 was 37.5%. Maryland's percent crop damage of Peaches to BMSB in 2011 was 34.5%.

New Jersey Rutgers Cooperative Extension, Fruit IPM Program routinely surveys the rates of insect and disease injury in harvested peaches, nectarines, and apples. Most of New Jersey's $30-35 million peach and nectarine production goes to wholesale markets, while most of NJ apples go to retail markets. Out 38 peach and nectarine samples, an average of 20.6% fruit damage was found. Some blocks had up to 55% damaged fruit. Most damaged fruit in the worst infested blocks had over 10 feeding sites per fruit. Late season cultivars, or those that are harvested after mid-August tended to be the most highly damaged. This level of damage was severe, even though tree fruit was intensely treated with multiple insecticide applications.

Dear Mr. Butler:

As the registrant for Brigade WSB, FMC supports the section 18 submission by Maryland (and the other supporting states) for the use of Brigade WSB Insecticide on apple, peach and nectarine for the control of Brown Marmorated Stink Bug, Halyomorpha halys.

Please let us know if you require any additional information.

Sincerely,

Adam Prestegord
Product Manager
FMC
FMC Corporation
North America Crop
1735 Market Street
Philadelphia, PA 19103
Office: 215.299.6250
Cell: 215.498.2874
Fax: 215.299.6810
www.FMCcrop.com

RESTRICTED USE PESTICIDE

Toxic to fish and aquatic organisms.

For retail sale to and use only by certified applicators or persons under their direct supervision, and only for those uses covered by the certified applicator's certificate

Brigade® WSB
Insecticide/Miticide

Section 18
EXEMPTION

FOR DISTRIBUTION AND USE ONLY IN MARYLAND

For Agricultural or Commercial Use Only
EPA File Symbol: 279-3108

EMERGENCY CALLS: 800-331-3148

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING

THIS LABELING MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.

This exemption is effective from ######## through ########.

Crop	Pest Controlled	Rate of Application
Apples, Pears, Peaches, Cherries	Brown Marmorated Stinkbug	32 oz/A (0.20 lbs ai/acre)

Directions for Use: Application by ground - apply as a dilute (minimum 200 gallons of finished spray per acre) or concentrate (minimum 50 gallons of finished spray per acre) in sufficient water to provide thorough coverage. Application by air - apply the specified dosage in a minimum of 10 gallons of finished spray per acre.

Restrictions: Do not apply more than 32 oz/acre (0.20 lbs ai/acre) per application. Do not apply more than 72 oz/A (0.45 lbs ai/acre). Do not make applications less than 30 days apart. Do not graze livestock in treated areas. Do not apply within 14 days of harvest.

FMC Corporation
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103

United Phosphorus, Inc.

David L. Olson
630 Freedom Business Center, Suite 402
King of Prussia, PA 19406
(610) 491-2814
dave.olson@uniphos.com

April 6, 2012

Bryan Butler
University of Maryland Extension
700 Agriculture Center
Westminster, MD 21157

RE: Bifenture EC and Bifenture 10DF Insecticides - Section 18 Letter of Support

Dear Mr. Butler:

Please be advised that United Phosphorus, Inc. (UPI) fully supports the proposed Section 18 emergency exemption for use of Bifenture EC and Bifenture 10DF Insecticides, containing the active ingredient bifenthrin, for control of Brown Marmorated Stink Bug (*Halyomorpha halys*) on apples, peaches and nectarines in Maryland (and other supporting States). The products we will supply are;

- Bifenture EC – EPA Reg. No. 70506-57
- Bifenture 10DF – EPA Reg. No. 70506-227

UPI will be able to supply product to meet the market demand.

Please contact me at 610-491-2814 or at dave.olson@uniphos.com if you have any questions regarding this information. If you have any questions of a technical nature, please contact our local representative Tony Estes at 864-202-7526, tony.estes@uniphos.com .

Sincerely,

David L. Olson
Director, Regulatory Affairs

cc. Tony Estes

Section 18

Products:	Bifenture® EC Agricultural Insecticide (EPA Reg. No. 70506-57) Bifenture® 10DF Insecticide/Miticide (EPA Reg. No. 70506-227)
Firm Name:	United Phosphorus, Inc. 630 Freedom Business Center, Suite 402 King of Prussia, PA 19406
Location:	Maryland
Crop/Site/Commodity:	Apples, Peaches, Nectarines
Target Pest/Problem:	Brown Marmorated Stink Bug (*Halyomorpha halys*)
Dosage:	Apply 5.12 – 12.8 fl ozs (0.08-0.20 lbs ai) per acre of **Bifenture EC Agriculatural Insecticide** (EPA Reg. No. 70506-57), or Apply 12.8 – 32.0 ozs (0.08-0.20 lbs ai) per acre of **Bifenture 10DF Insecticide/Miticide** (EPA Reg. No. 70506-227) Use higher rates under heavy insect pressure
Dilution Rate:	**By Ground:** Apply as a dilute spray (minimum of 200 gallons of finished spray per acre) or concentrate (minimum of 50 gallons of finished spray per acre). For best control, thorough coverage is necessary. **By Air:** Apply in a minimum of 10 gallon per acre using the specified use rate for control. For best control, thorough coverage is necessary.
Method of Application:	Ground or Air
Frequency/Timing of Applications:	Applications should be applied when populations reach locally determined economic thresholds. Consult the cooperative extension service, professional consultants or other qualified authorities to determine appropriate threshold levels for treatment in your area. Do not apply more than 32 fl ozs (0.50 lbs ai) of **Bifenture EC Agricultural Insecticide** or 80 ozs (0.50 lbs ai) of **Bifenture 10DF Insecticide/Miticide** per acre per season. Apply as necessary to maintain control using a minimum of 30-day spray intervals. Do not graze livestock in treated orchards or cut treated cover crops for feed.
Restricted Entry Interval (REI):	12 hours
Pre-Harvest Interval (PHI):	14 days
Restricted Use:	**<u>RESTRICTED USE PESTICIDE:</u> WHEN USED IN MARYLAND, APPLICATIONS CAN ONLY BE MADE BY CERTIFIED APPLICATORS OR BY PERSONS UNDER THEIR DIRECT SUPERVISION AND ONLY FOR THOSE USES COVERED BY THE CERTIFIED APPLICATORS CERTIFICATION.**

Appendix 3.

Performance of Selected Insecticides on Brown Marmorated Stink Bug

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Selected insecticides were evaluated at Virginia Tech in 2011 using green bean dip bioassays on brown marmorated stink bug nymphs and adults, as well as field efficacy trials on bell peppers. For the latter, four weekly spray applications were made using a backpack sprayer, and % stink bug injury to pepper fruit was assessed on three post-spray harvest dates (in Aug). Insecticides were ranked based on their average performance across all three experiments.

		% mortality from bean dip bioassay*			
Product	**Rate oz/Acre**	**Nymph**	**Adult**	**% control in the field: peppers****	**Avg. % control from all three experiments**
Permethrin 3.2EC	8	97.5	98.8	60.6	85.6
Scorpion 3.24	7.7	76.7	90.0	85.4	84.0
Bifenture 10DF	12.8	100.0	81.9	56.3	79.4
Trebon	8	100.0	100.0	36.5	78.8
Baythroid XL	2.8	92.5	88.2	52.8	77.8
Venom 70	4	100.0	80.0	46.0	75.3

* Mortality refers to the percentage of dead + moribund individuals after 72 hrs.
** Based on reduction in stink bug injury to pepper fruit from three harvests.
[a] Not the highest labeled rate for all vegetables.
Premethrin not labeled on apple post bloom.

Figure 1.

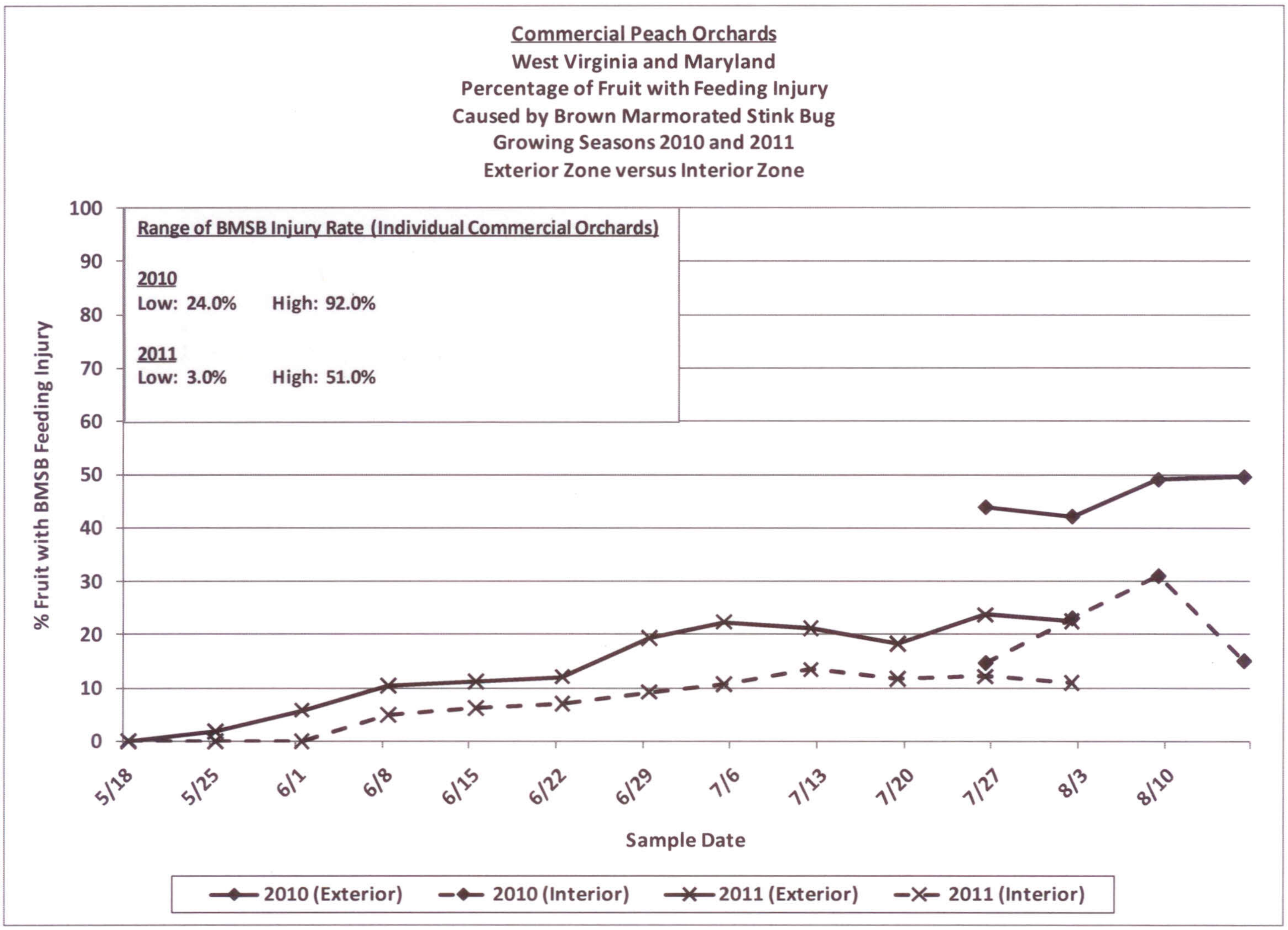
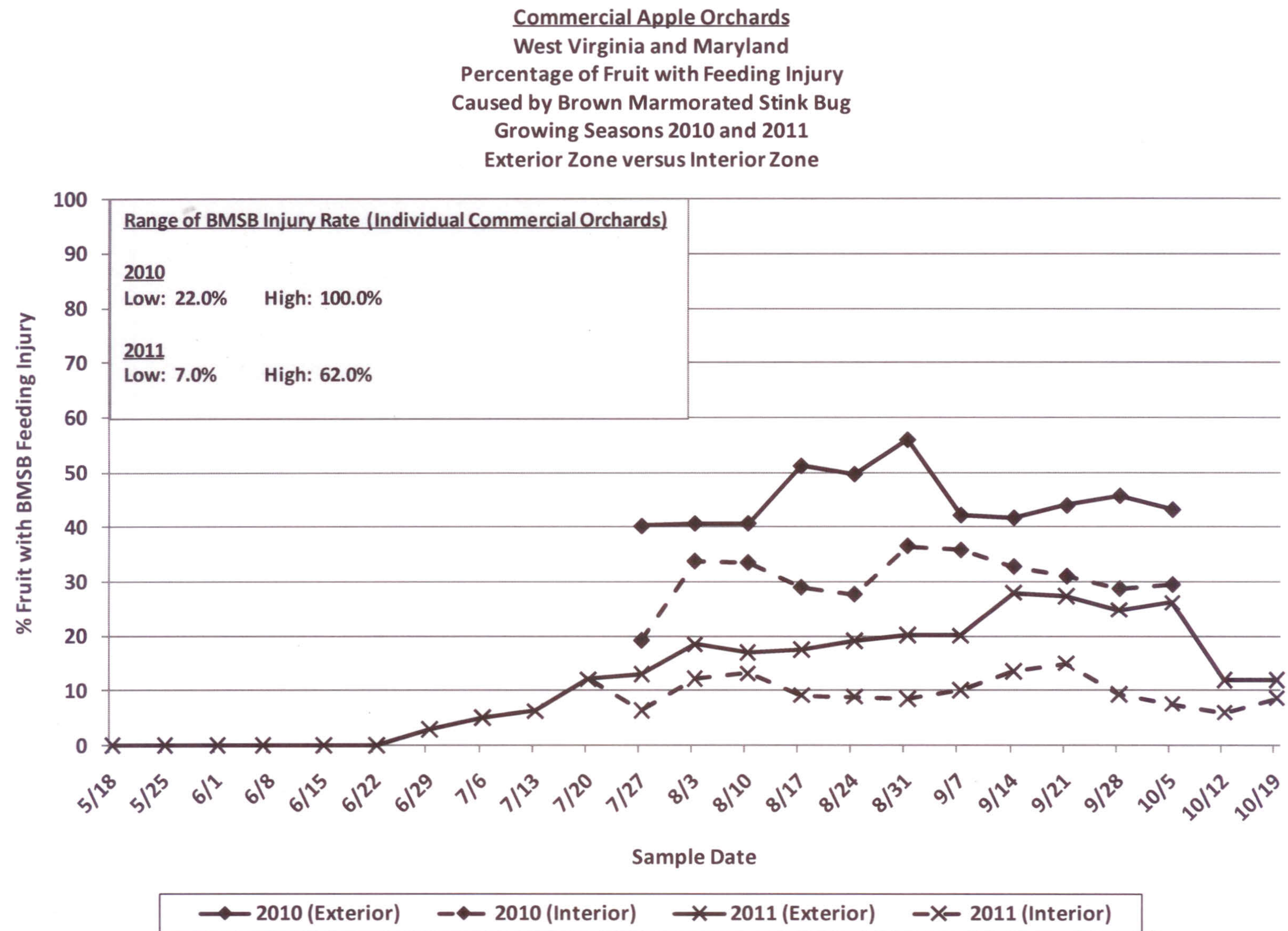


Figure2.


Commercial Apple Orchards
West Virginia and Maryland
Percentage of Fruit with Feeding Injury
Caused by Brown Marmorated Stink Bug
Growing Seasons 2010 and 2011
Exterior Zone versus Interior Zone
Range of BMSB Injury Rate (Individual Commercial Orchards)
2010
Low: 22.0% High: 100.0%
2011
Low: 7.0% High: 62.0%
% Fruit with BMSB Feeding Injury
100
90
80
70
60
50
40
30
20
10
0
5/18
5/25
6/1
6/8
6/15
6/22
6/29
7/6
7/13
7/20
7/27
8/3
8/10
8/17
8/24
8/31
9/7
9/14
9/21
9/28
10/5
10/12
10/19
Sample Date
2010 (Exterior)
2010 (Interior)
2011 (Exterior)
2011 (Interior)